

**Navigation Improvement Study of  
the  
Upper Mississippi River Near  
Savanna Bay, Pool 13**

**Sedimentation and Hydrodynamic  
Investigation**

**Volume 2 of 2**

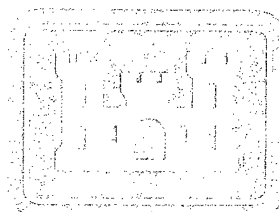
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**US Army Corps  
of Engineers**

ILLINOIS  
Carroll County

2 298 000 E

Savanna Bay

2 296 000 E

Mississippi Palisades State Park

Sweeney  
Islands

Island 266

Boy Scout Island

IOWA  
Jackson County

Dike 539.2R

Sabula Slough

1 990 000 N

EL: 10  
EL: 0  
EL: -10  
EL: -20  
EL: -30



ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL



U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND  
CORPS OF ENGINEERS  
ROCK ISLAND, ILLINOIS

PREPARED BY: C. MATHEWS  
DRAWN BY: C. MATHEWS  
CHECKED BY: R. DAVENPORT

SAVANNA BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
1996 PROTOTYPE SURVEY

800 400 0 800 FT

GRAPHIC SCALE: 1" = 800'  
DATE: 10/96  
SHEET NO. 20

ILLINOIS

Carroll County

Savanna Bay

Island 266

Sweeney Islands

Dike 539.2R

Sabula Slough

Santa Fe Island

Riprap Island

Dike 540.9R

Dike 540.8R

Dike 540.7R

IOWA  
Jackson County



ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

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SAVANNA BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 542-537

BASE TEST

800 400 0 800 FT

GRAPHIC SCALE

1:100,000

DATE

21

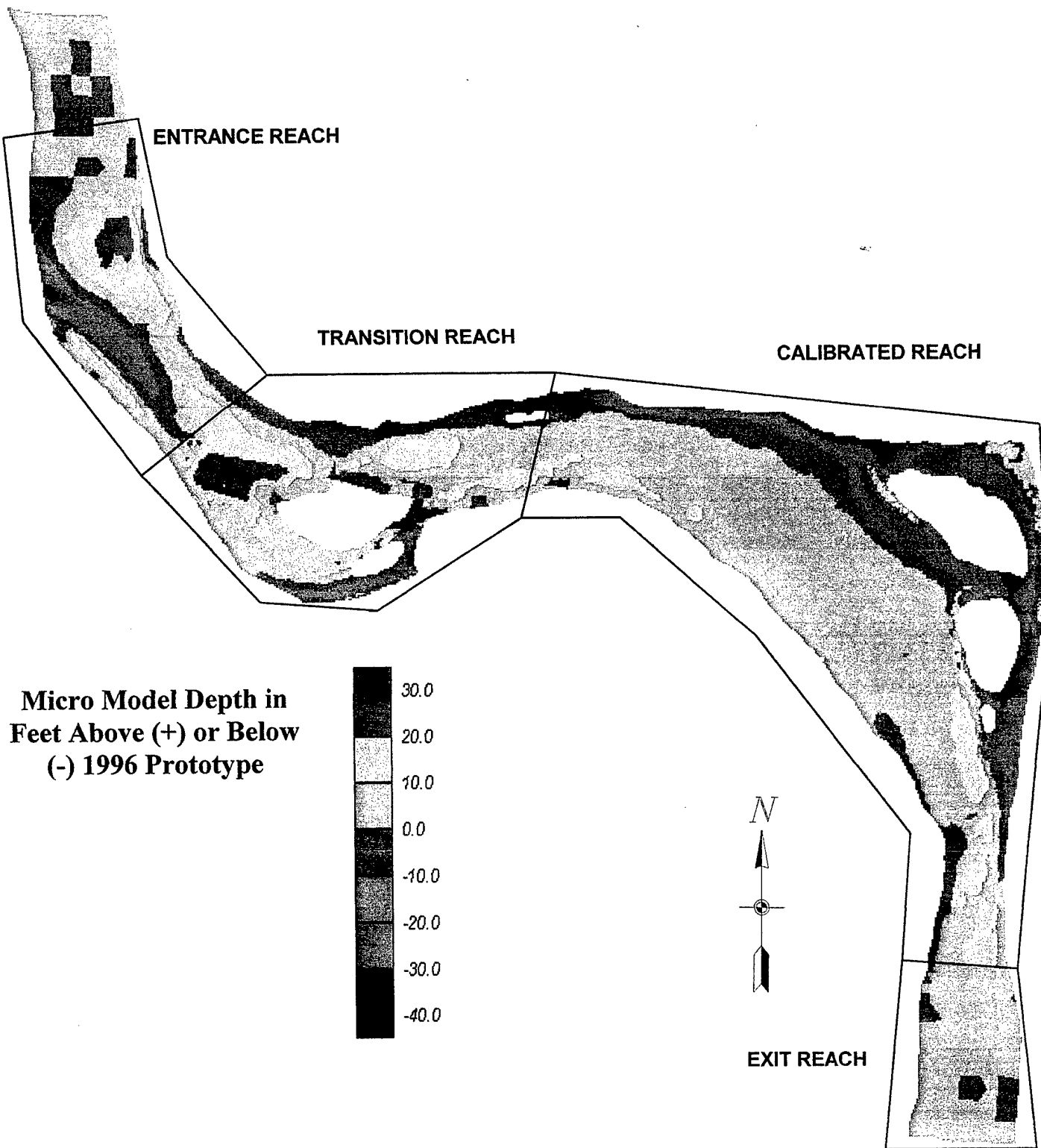


PREPARED BY: C. MATHES  
DRAWN BY: C. MATHES  
BY: R. DAVENPORT

1 988 000 N

1 986 000 N

1 984 000 N



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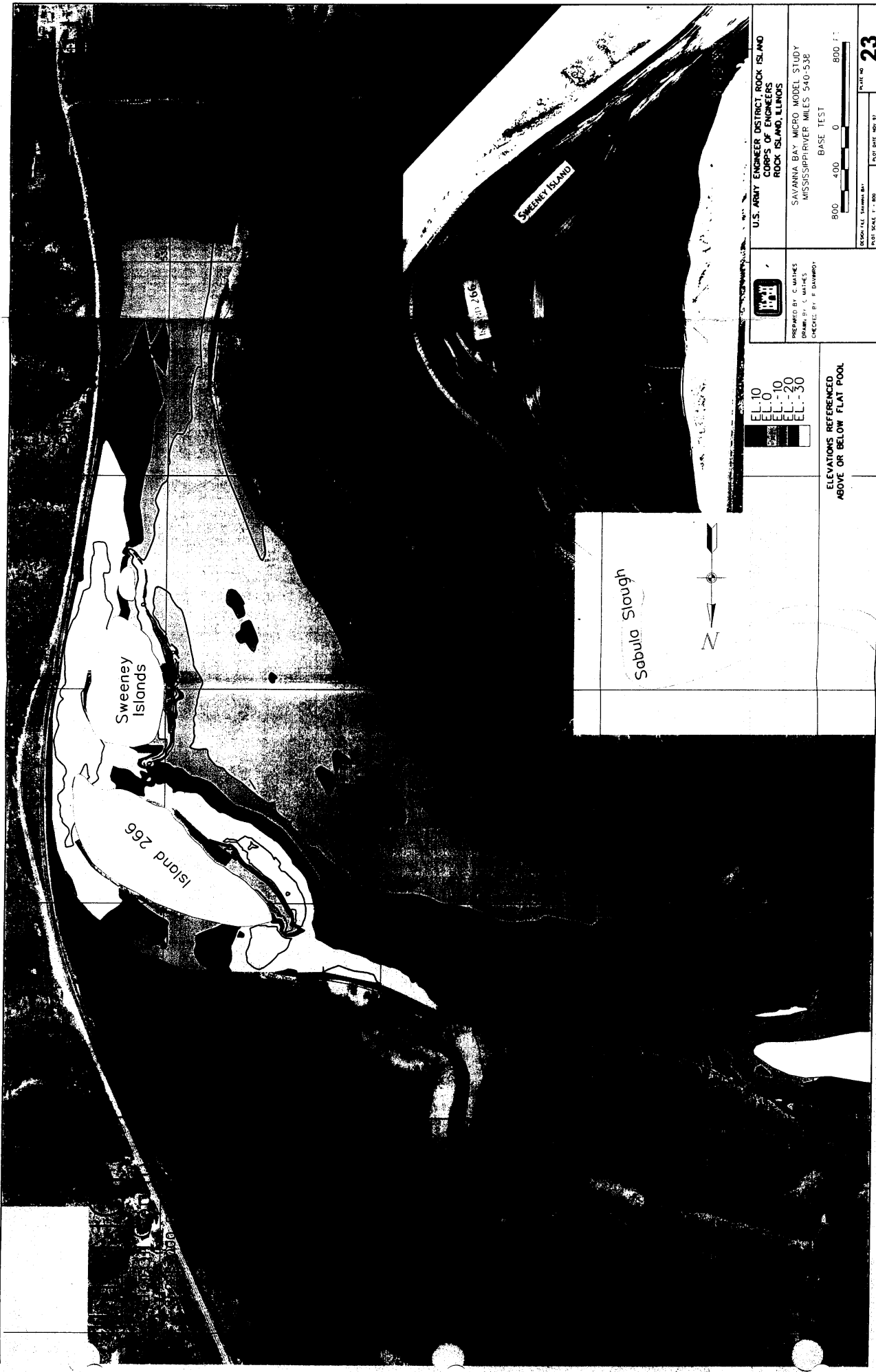
PREPARED BY: T. Wikeong  
CHECKED BY: R. Devivoy

**Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13**

Comparison of Prototype Bathymetry Versus  
Micro Model Bathymetry

PLATE NO.

**22**



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SAVANNAH BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538

BASE TEST

800 400 0 800 FT

DESIGN: L. E. SAVANNAH BAY  
PLOT DATE: NOV 57  
SCALE: 1" = 800'

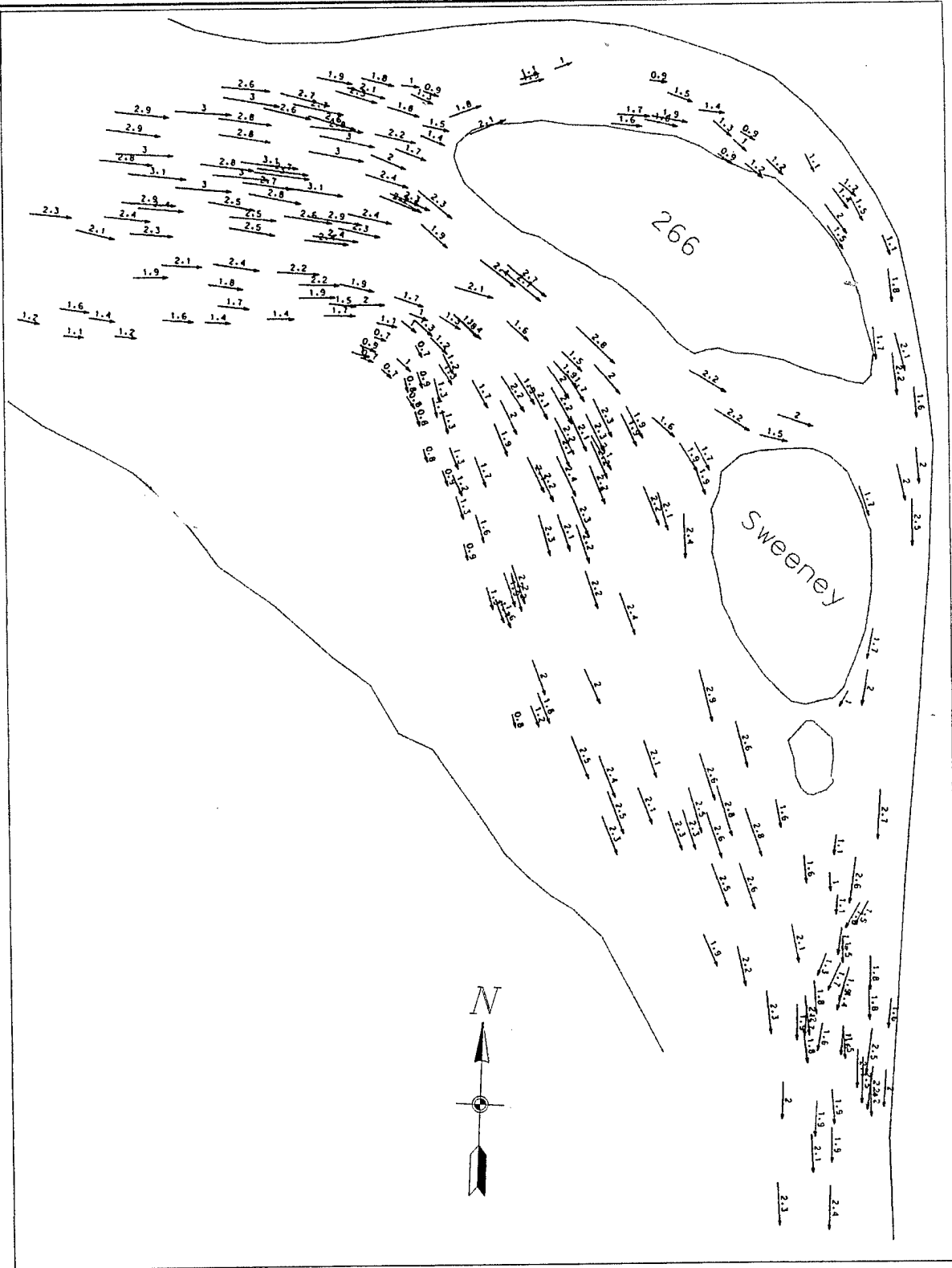
PLATE NO. 23

EL. 10  
EL. 0  
EL. -10  
EL. -20  
EL. -30

ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

SABULA SLOUGH

N



PREPARED BY: C. Mathes  
CHECKED BY: R. Davenport

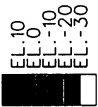
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**Navigation Improvement Study of the Upper Mississippi  
River Near Savannah Bay, Pool 13**

**Base Test  
Micro Model Flow Visualization Velocity Diagram**

PLATE NO.

**24**

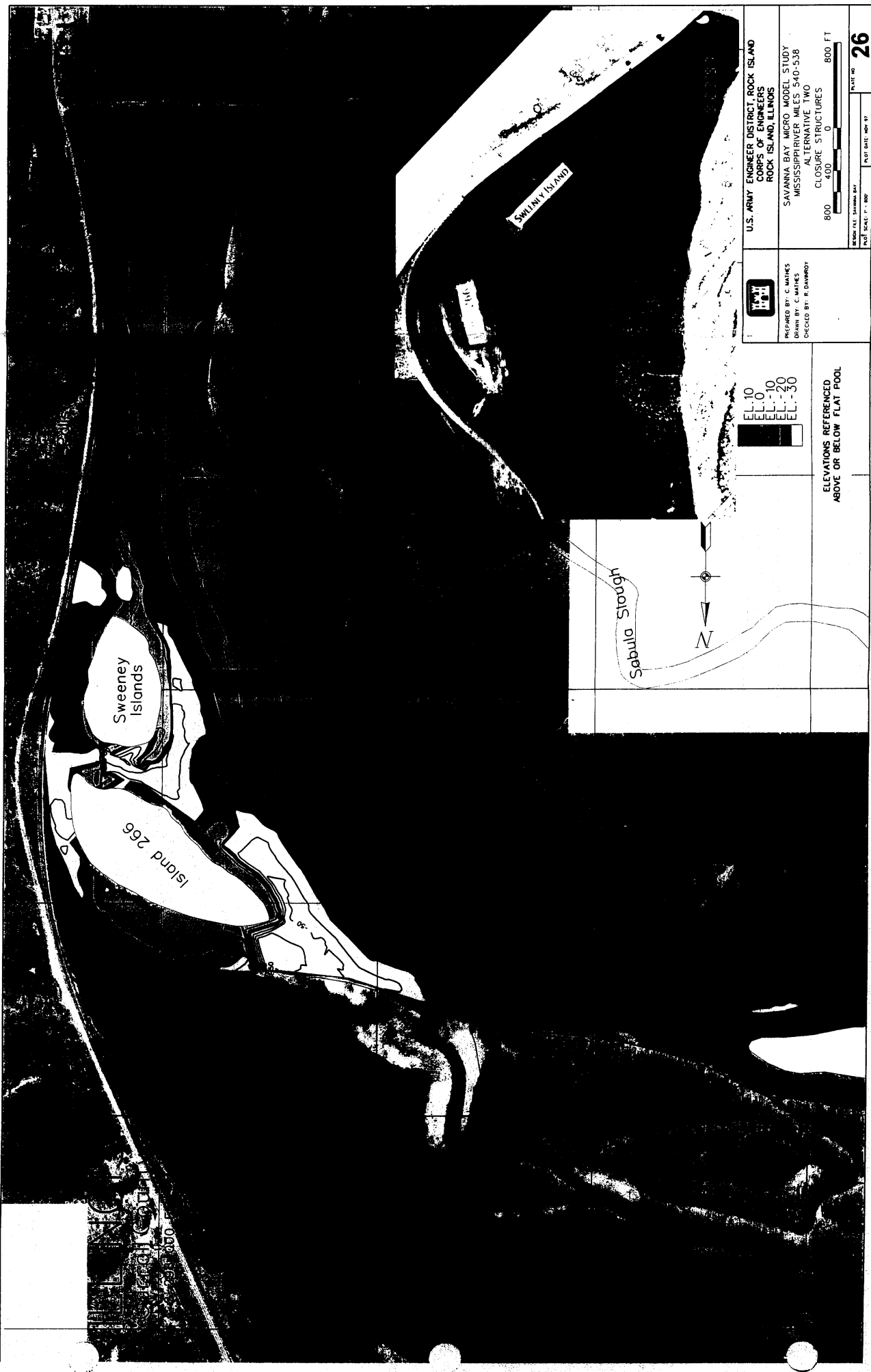



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SAVANNA BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE ONE  
CLOSURE STRUCTURES

800  
400  
0  
800 FT

DESIGN FILE: SAVANNA BAY  
PLOT DATE: MAY 91  
PLOT SCALE: 1" = 800'  
PLATE NO: 25



	U.S. ARMY ENGINEER DISTRICT, ROCK ISLAND CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS
	SAVANNAH BAY MICRO MODEL STUDY MISSISSIPPI RIVER MILES 540-538 CLOSURE STRUCTURES ALTERNATIVE TWO
800 400 0 800 FT	
REGION 14C, SAVANNAH BAY PLAT NO. 26	

ELEVATIONS REFERENCED ABOVE OR BELOW FLAT POOL
10 0 -10 -20 -30





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	SAVANNAH BAY MICRO MODEL STUDY MISSISSIPPI RIVER MILES 540-538 ALTERNATIVE THREE OPTION ONE WITH WINGDAMS 800 FT	
DESIGN FILE: SAVANNAH BAY PROJECT SCALE: 1" = 800'		PLATE NO. <b>27</b>

ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL



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SAVANNA BAY MICRO MODEL STUDY  
 MISSISSIPPI RIVER MILES 540-538  
 ALTERNATIVE FOUR  
 OPTION TWO WITH WINGDAMS

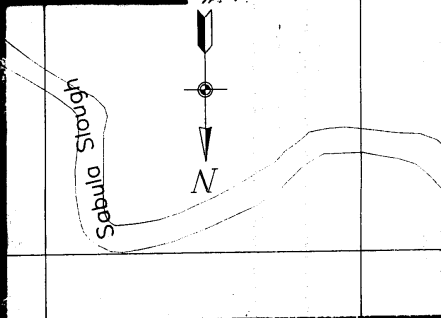
800 400 0 800 FT

DESIGN FILE: SAVANNA BAY  
 PLOT SCALE: 1" = 800'

PLATE NO. **28**

PREPARED BY: C. MAYES  
 DRAWN BY: C. MAYES  
 CHECKED BY: R. DAVENPORT

ELEVATIONS REFERENCED  
 ABOVE OR BELOW FLAT POOL





EL: 10  
EL: 0  
EL: -10  
EL: -20  
EL: -30

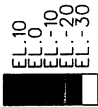
ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

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SAVANNAH BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE FIVE

WINGDAMS  
800 400 0 800 FT

DESIGN FILE SAVANNAH BAY  
PLOT SCALE 1" = 800'  
PLOT DATE NOV 97  
PLATE NO. 29



PREPARED BY: C. MATHES  
DRAWN BY: C. MATHES  
CHECKED BY: R. DAVENPORT

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ROCK ISLAND, ILLINOIS

SAVANNAH BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE SIX  
REVETMENT CONNECTOR  
800 400 0 800 FT

DESIGN FILE: SAVANNAH BAY  
PROJECT SCALE: 1" = 800'  
PLATE NO. 30



ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

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SAVANNAH BAY, MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE SEVEN  
STUB DIKE OFF REVELMENT

800 400 0 800 FT

DESIGN: TAC, SAVANNAH BAY  
PLOT SCALE: 1" = 800'  
PLOT DATE: NOV 57  
PLOT NO: 31





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SAVANNAH BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE NINE  
THREE CLOSURE STRUCTURES

800 400 0 800 FT

DESIGN FILE SAVANNAH BAY  
PROJECT SCALE 1" = 800'  
PLATE NO. 33

PREPARED BY: C. MATHES  
DRAWN BY: C. MATHES  
CHECKED BY: R. DAWBNEY

ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

10  
20  
30

Sabula Slough

N



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SAVANNAH BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE TEN  
SECOND CLOSURE FORWARD

800 400 0 800 FT

DESIGN DATE: SAVANNAH BAY  
PLOT SCALE: 1" = 800'

DATE NO. **34**

ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

1:10  
1:10  
1:10  
1:20  
1:30

Sabula Slough

N





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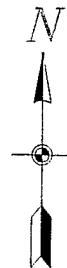
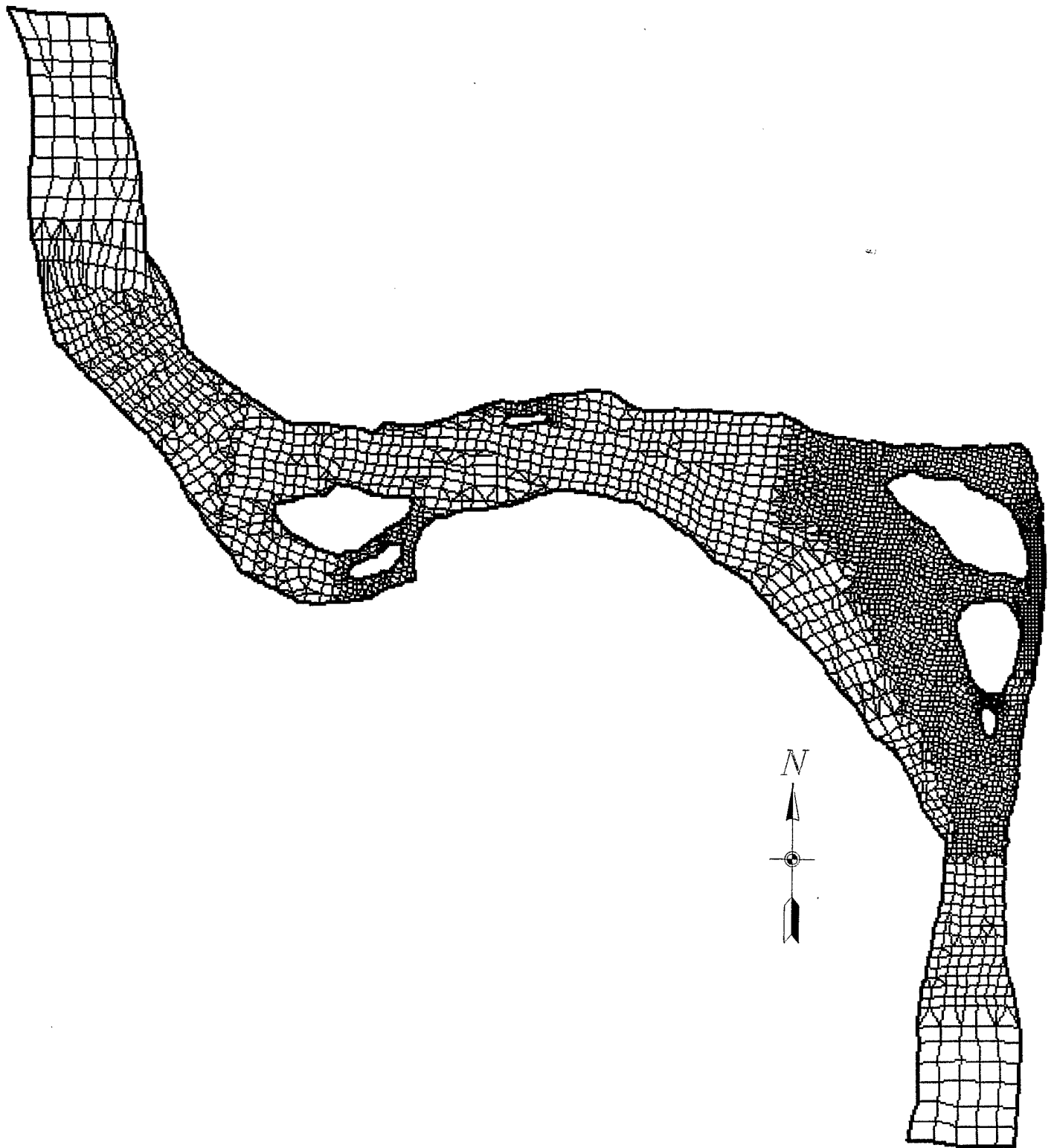
SAVANNA BAY MICRO MODEL STUDY  
MISSISSIPPI RIVER MILES 540-538  
ALTERNATIVE ELEVEN  
CLOSURE STRUCTURES LOWERED  
800 400 0 800 FT

DESIGN FILE SAVANNAH  
PLOT SCALE 1" = 800'

PLATE NO  
**35**

ELEVATIONS REFERENCED  
ABOVE OR BELOW FLAT POOL

Sabula Slough



PREPARED BY: T. Kirkseong  
CHECKED BY: R. Daveroy

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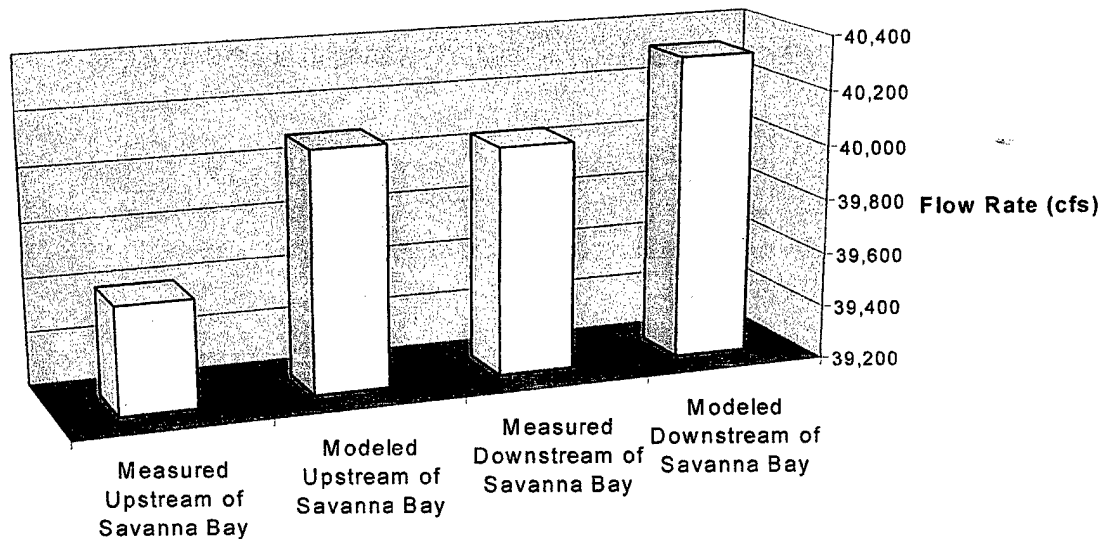
Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Finite Element Grid,  
SMS Model

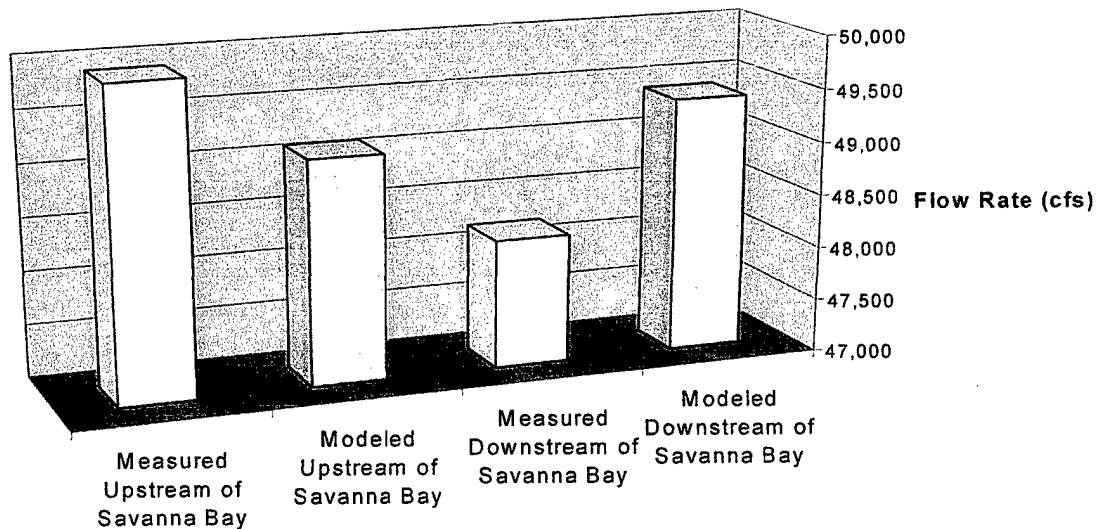
PLATE NO.

**36**

**Main Channel**  
**Savanna Bay Flow Measurements vs. SMS Modeling Results**  
 Mississippi River, 40,000 cfs



**Main Channel**  
**Savanna Bay Flow Measurements vs. SMS Modeling Results**  
 Mississippi River, 49,000 cfs



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PREPARED BY: T. Kirkong  
 CHECKED BY: R. Dawkay

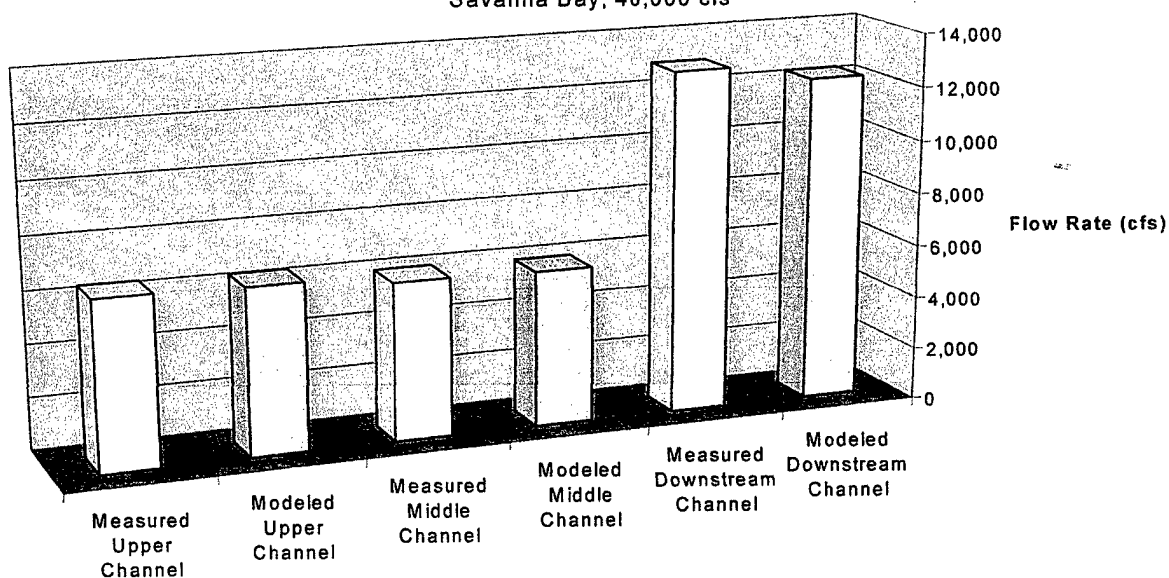
Navigation Improvement Study of the Upper Mississippi  
 River Near Savanna Bay, Pool 13

Main Channel  
Measured Flow vs. SMS Modeling Results

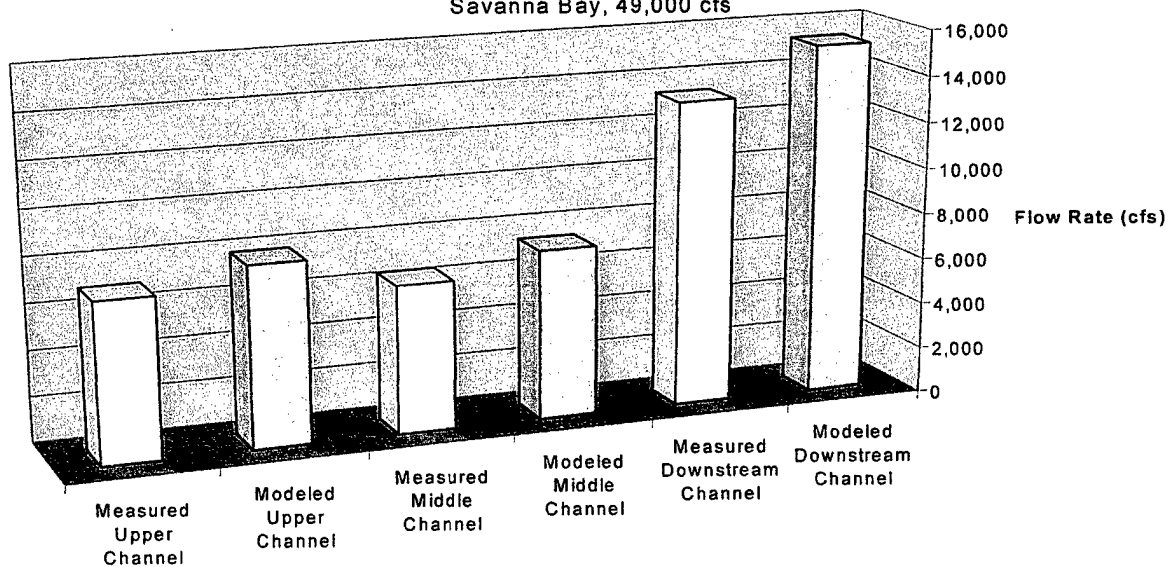
PLATE NO.

**37**

**Side Channel Openings**  
**Savanna Bay Flow Measurements vs. SMS Modeling Results**  
 Savanna Bay, 40,000 cfs



**Side Channel Openings**  
**Savanna Bay Flow Measurements vs. SMS Modeling Results**  
 Savanna Bay, 49,000 cfs



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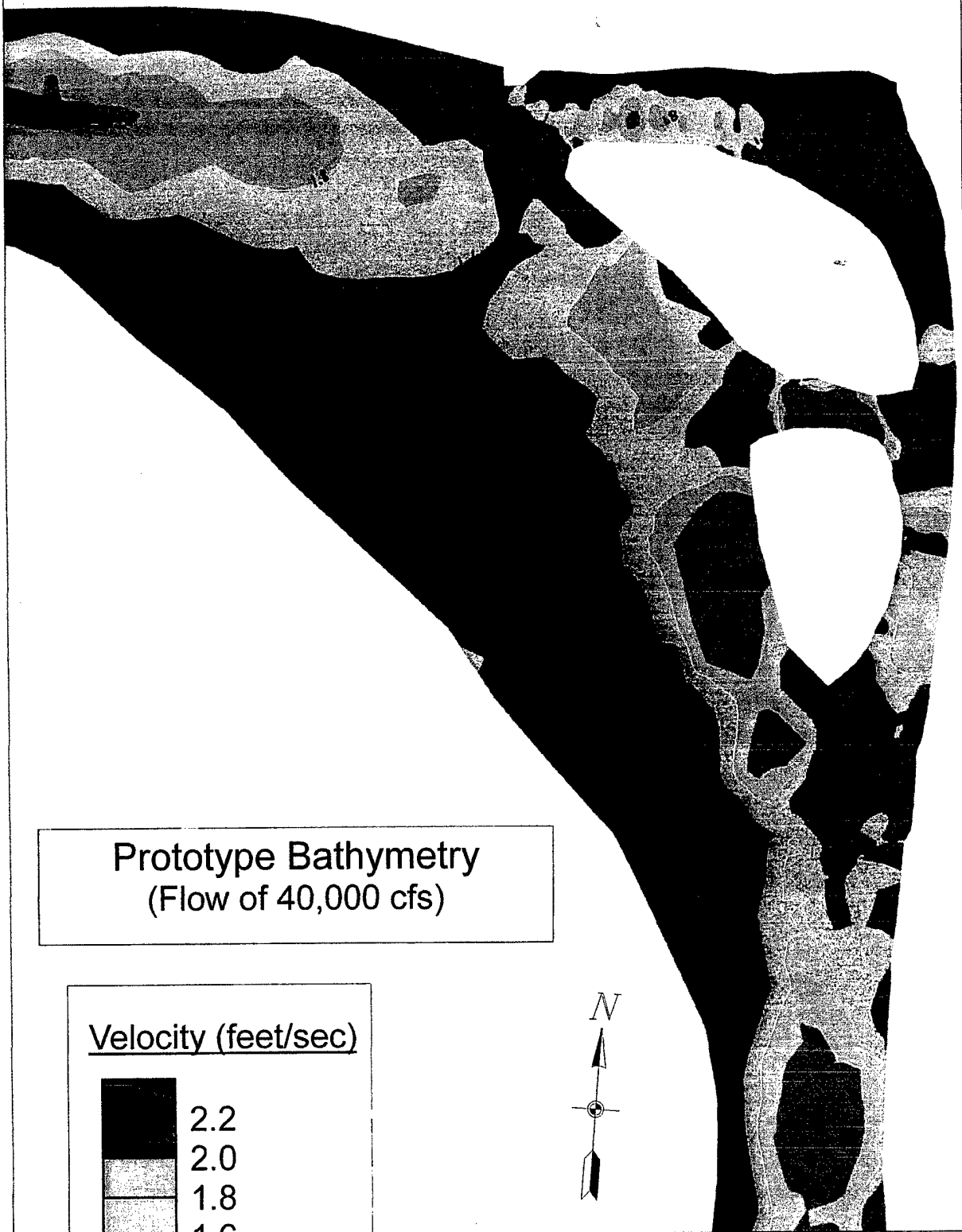
PREPARED BY: T. Kirkceng  
 CHECKED BY: R. Daviney

Navigation Improvement Study of the Upper Mississippi  
 River Near Savanna Bay, Pool 13

Side Channel Openings  
Measured Flow vs. SMS Modeling Results

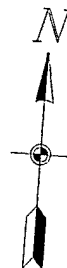
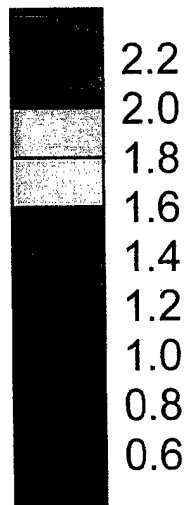
PLATE NO.

**38**



Prototype Bathymetry  
(Flow of 40,000 cfs)

Velocity (feet/sec)



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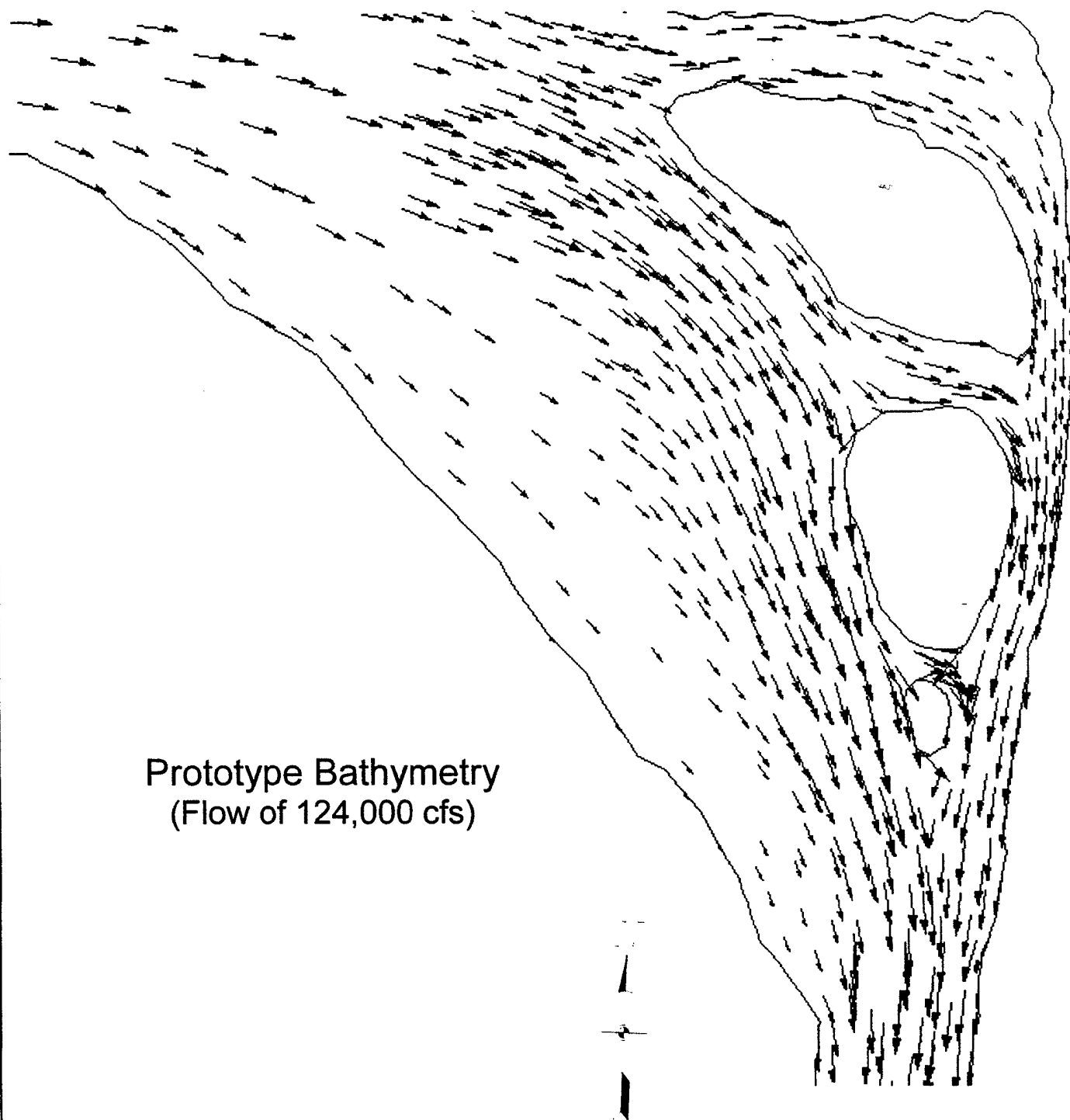
PREPARED BY: T. Kikeeng  
CHECKED BY: R. Deviney

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth Averaged Velocity Contours,  
SMS Model

PLATE NO.

**39**



Prototype Bathymetry  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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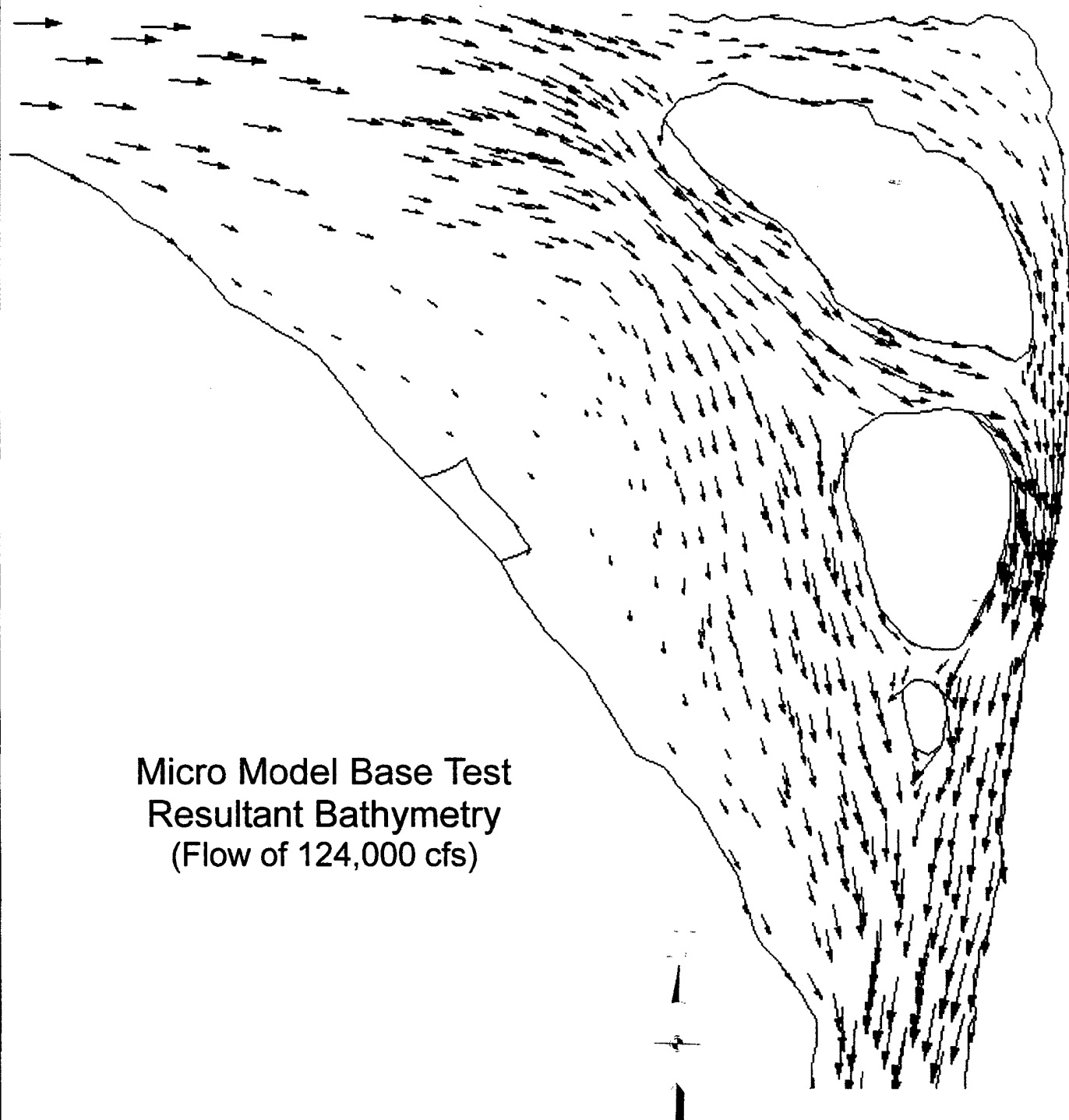
PREPARED BY: T. Kakeong  
CHECKED BY: R. Dawsey

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

**40**



Micro Model Base Test  
Resultant Bathymetry  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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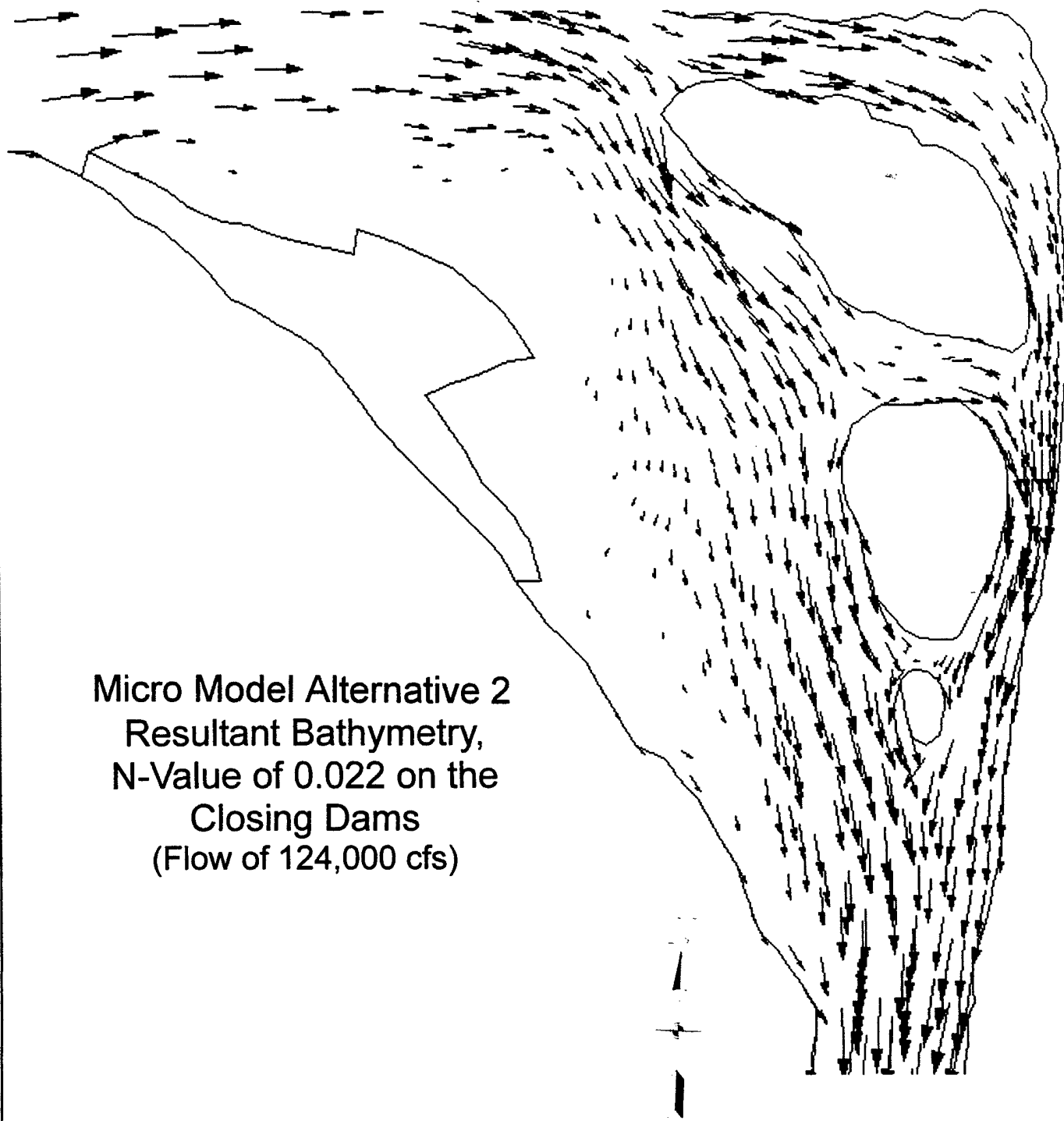
PREPARED BY: T. Kirseng  
CHECKED BY: R. Devenay

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

**41**



Micro Model Alternative 2  
Resultant Bathymetry,  
N-Value of 0.022 on the  
Closing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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PREPARED BY: T. Kulseng  
CHECKED BY: R. Dewdney

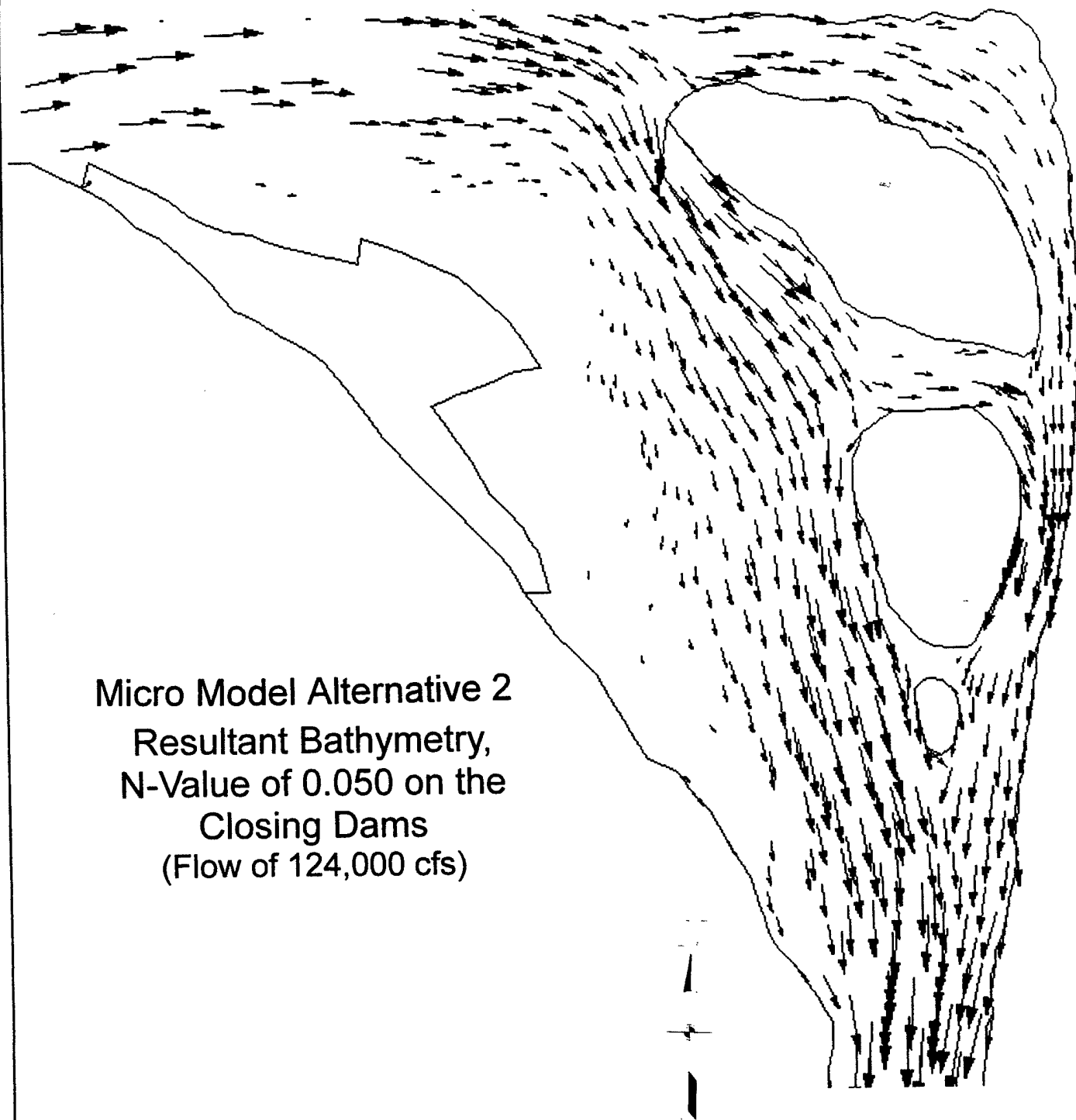
Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

42





Micro Model Alternative 2  
Resultant Bathymetry,  
N-Value of 0.050 on the  
Closing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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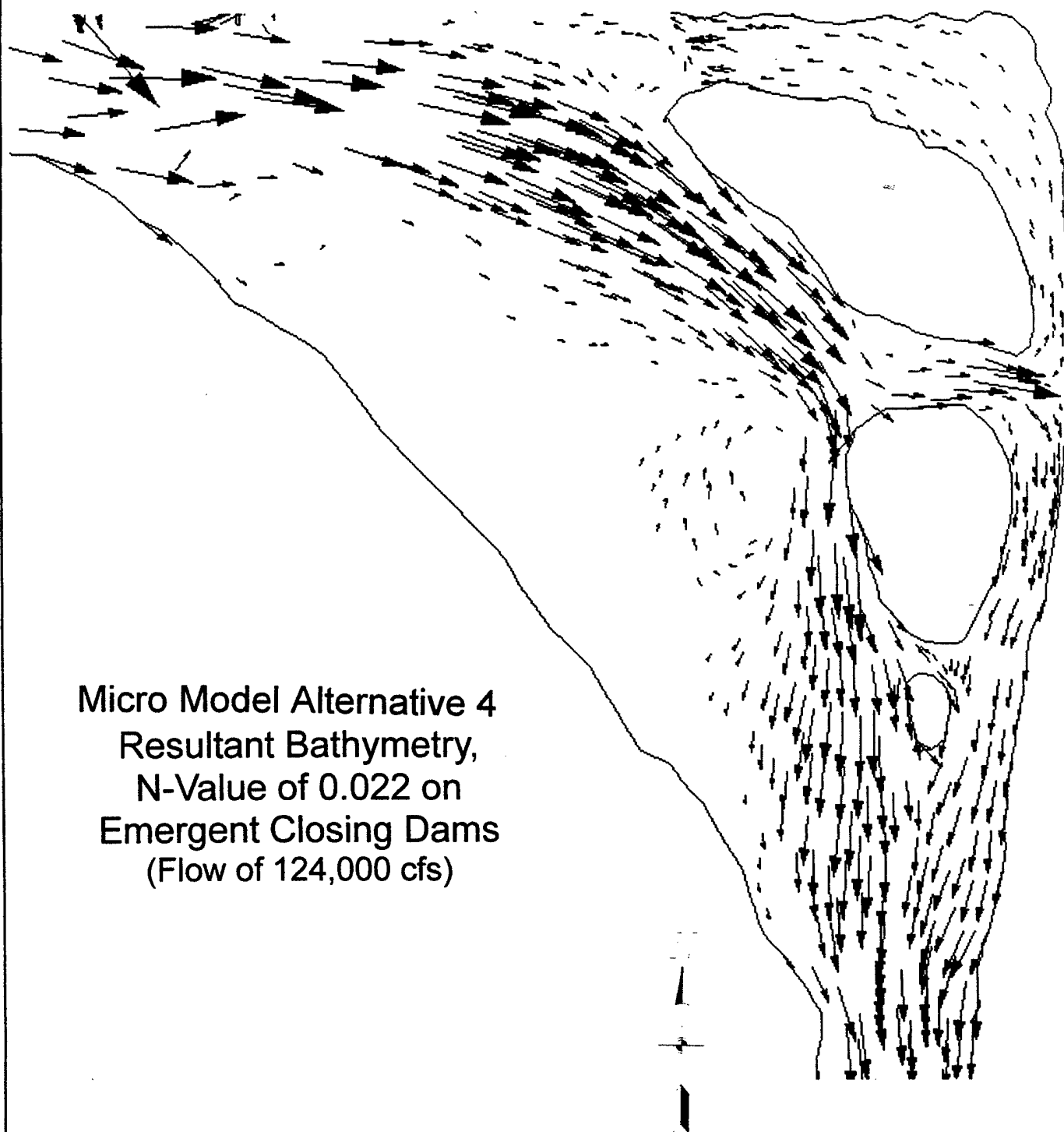
PREPARED BY: T. Krukeing  
CHECKED BY: R. Deveroy

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

**43**



Micro Model Alternative 4  
Resultant Bathymetry,  
N-Value of 0.022 on  
Emergent Closing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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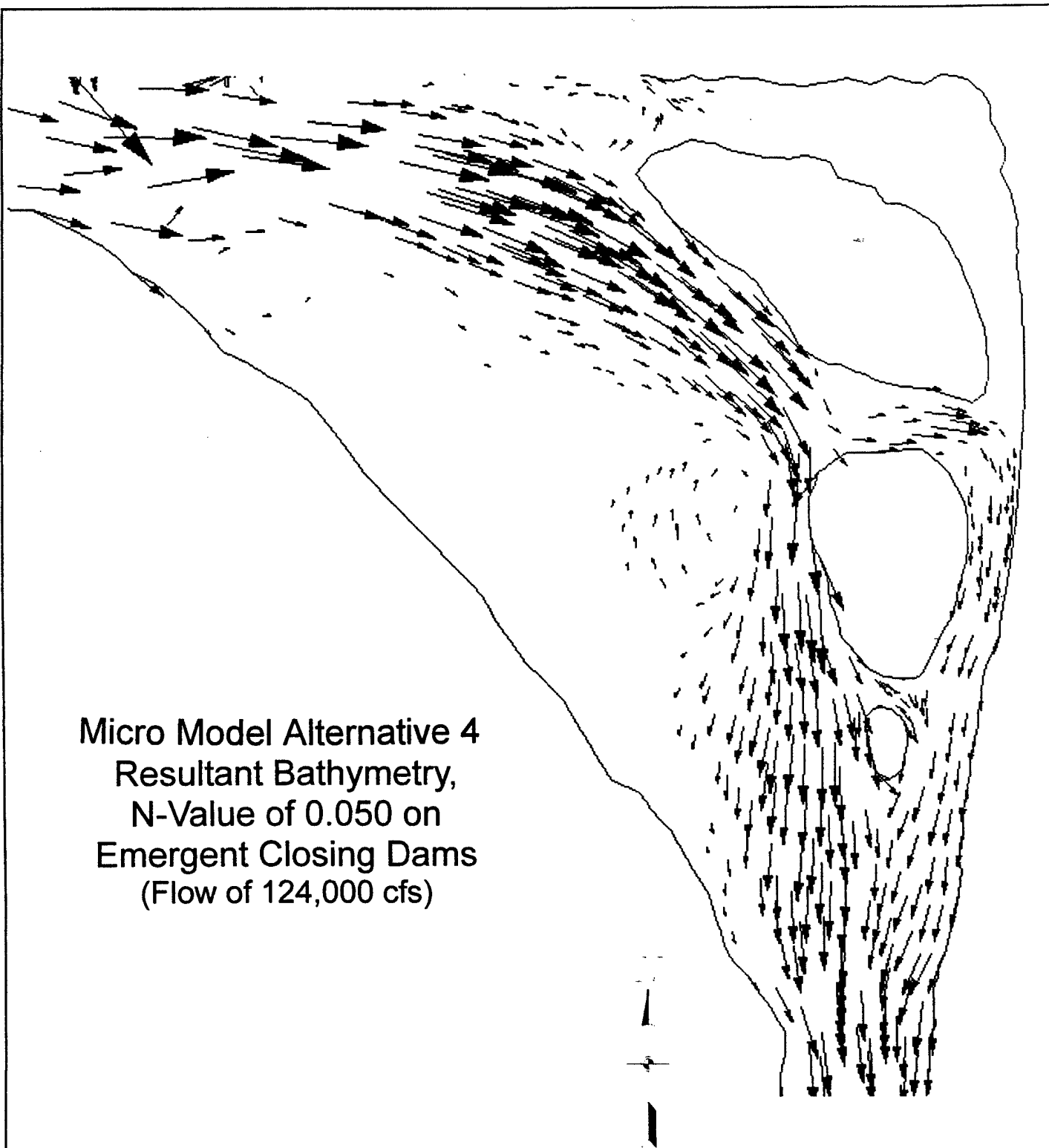
PREPARED BY: T. Kirsberg  
CHECKED BY: R. Devenney

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO.

**44**



Micro Model Alternative 4  
Resultant Bathymetry,  
N-Value of 0.050 on  
Emergent Closing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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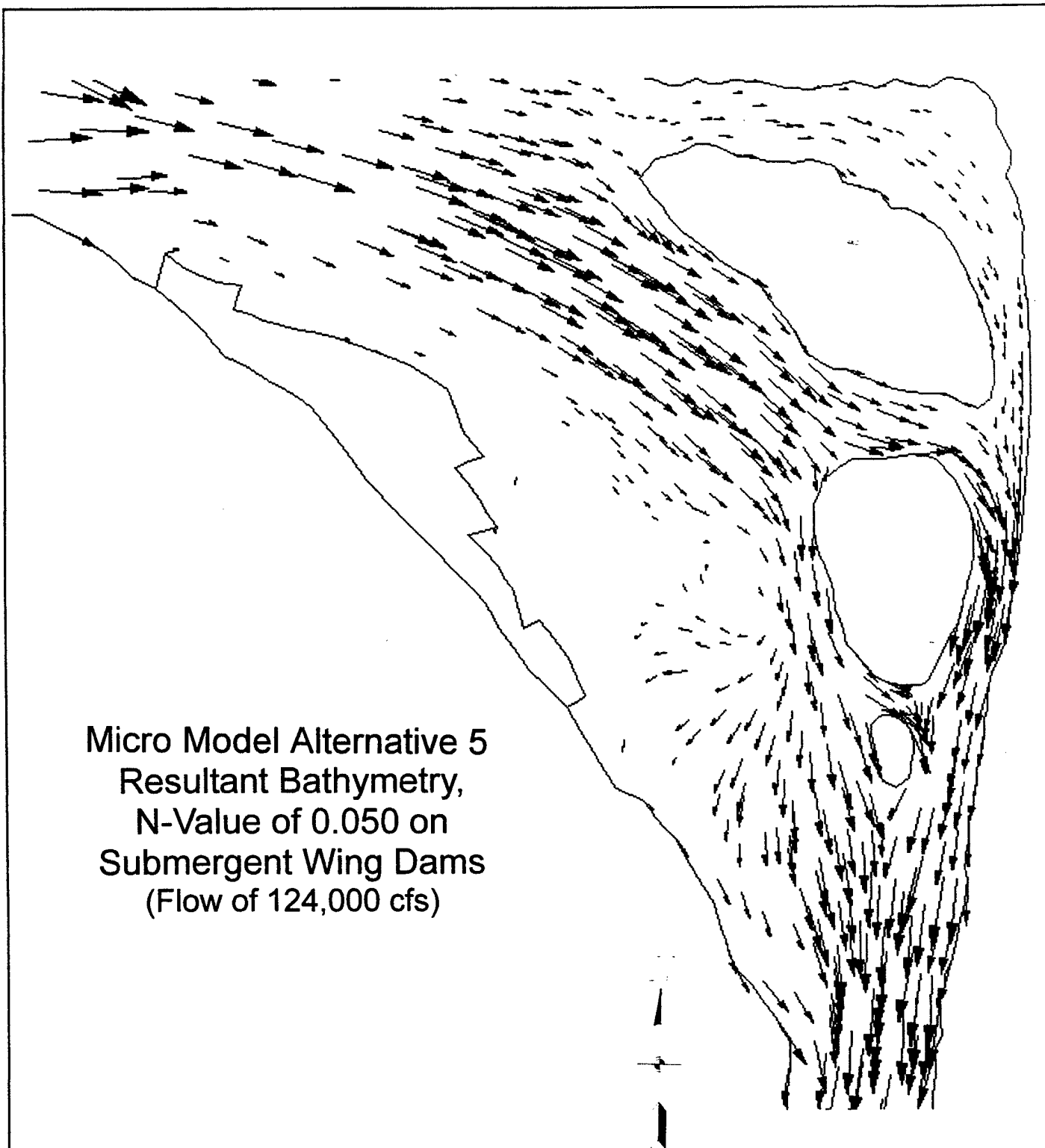
PREPARED BY: T. Kirskeing  
CHECKED BY: R. Dennyroy

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

45



Micro Model Alternative 5  
Resultant Bathymetry,  
N-Value of 0.050 on  
Submergent Wing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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PREPARED BY: T. Kiskaeng  
CHECKED BY: R. Davenport

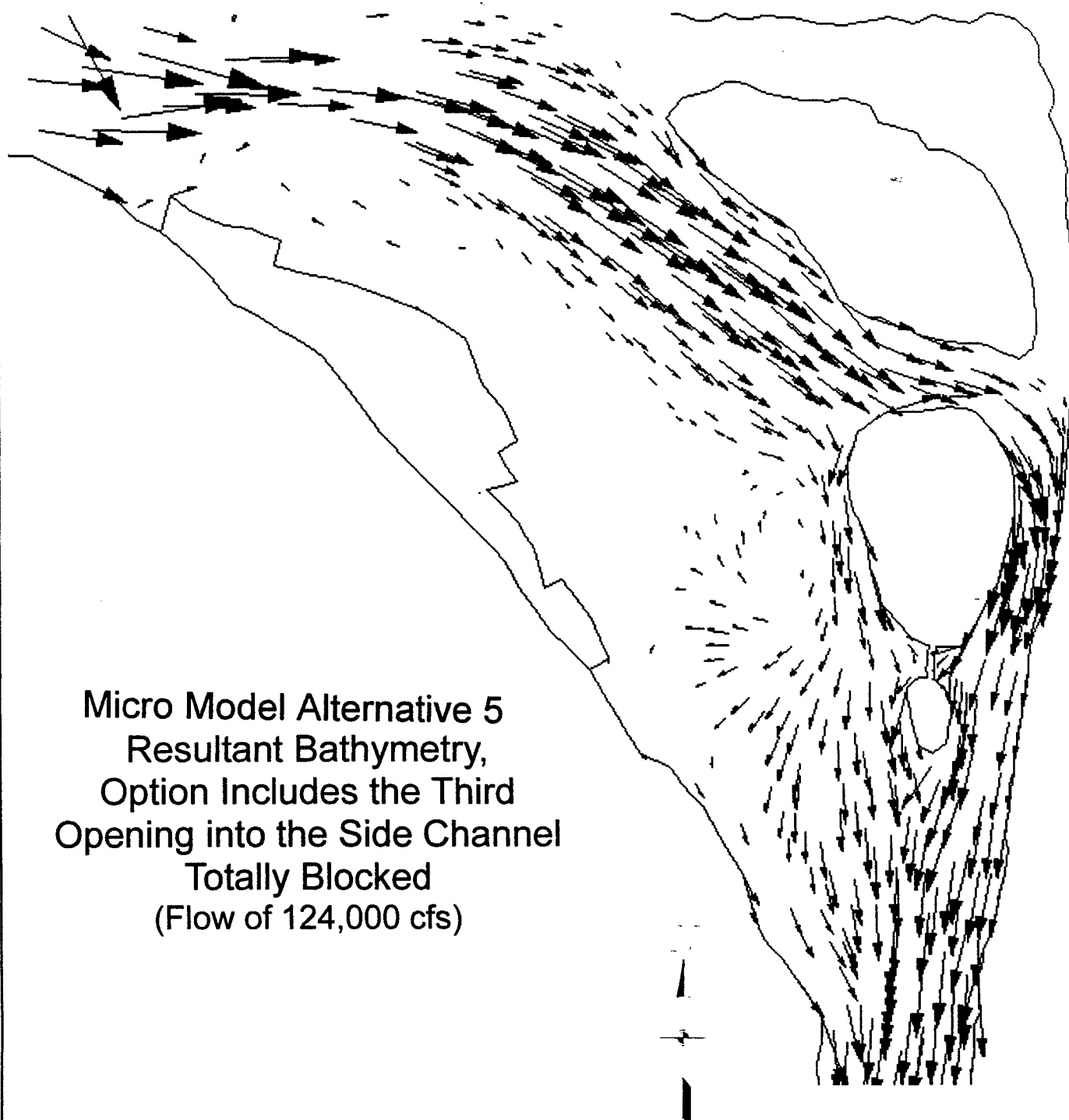
Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

46

Micro Model Alternative 5  
 Resultant Bathymetry,  
 Option Includes the Third  
 Opening into the Side Channel  
 Totally Blocked  
 (Flow of 124,000 cfs)



Vector Velocity Scale:

→  
 5 feet/sec



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PREPARED BY: T. Kikueong  
 CHECKED BY: R. Dewdney

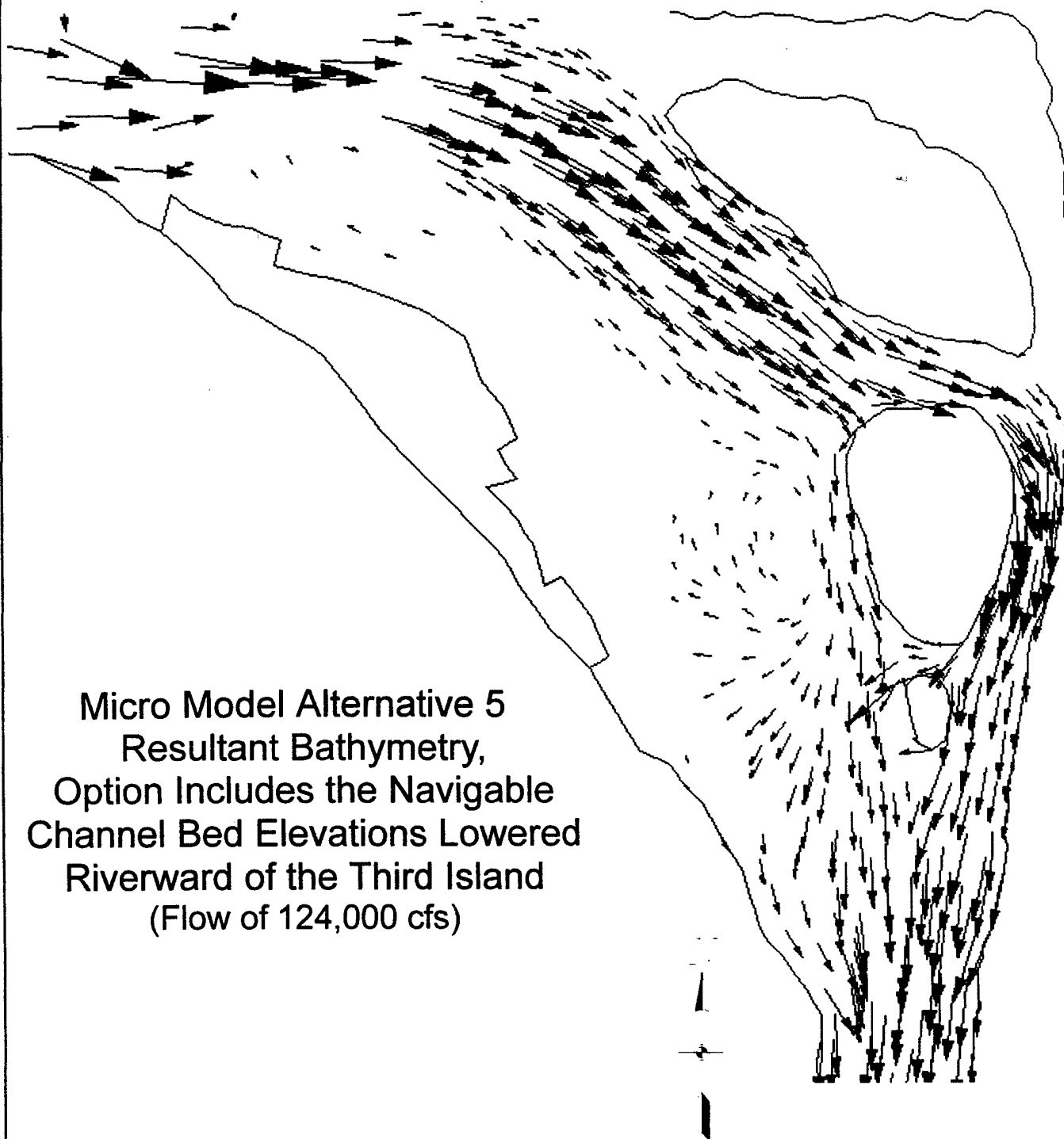
Navigation Improvement Study of the Upper Mississippi  
 River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

47

Micro Model Alternative 5  
 Resultant Bathymetry,  
 Option Includes the Navigable  
 Channel Bed Elevations Lowered  
 Riverward of the Third Island  
 (Flow of 124,000 cfs)



Vector Velocity Scale:

→  
 5 feet/sec



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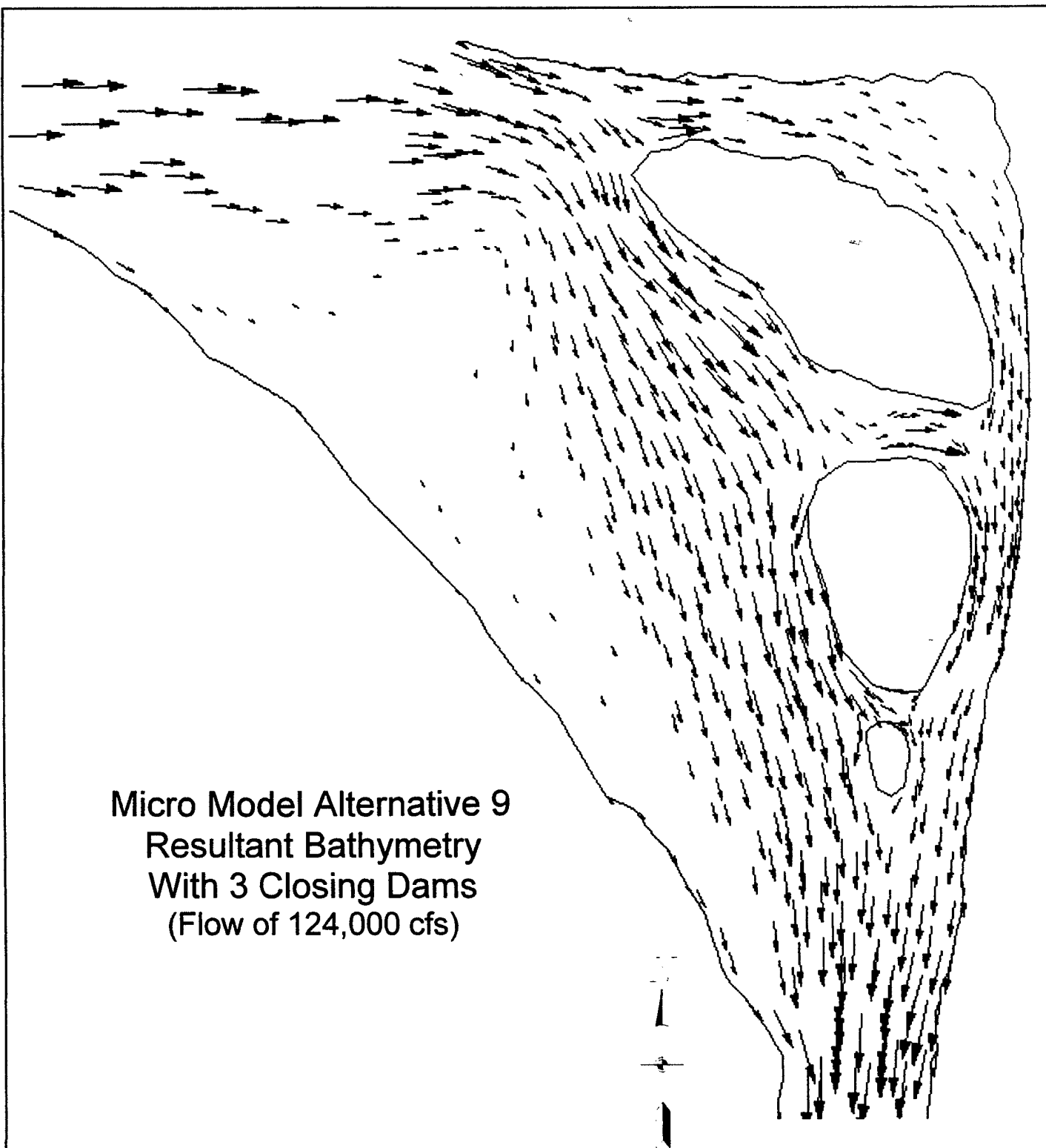
PREPARED BY: T. Krukeing  
 CHECKED BY: R. Dewdney

Navigation Improvement Study of the Upper Mississippi  
 River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO

48



Micro Model Alternative 9  
Resultant Bathymetry  
With 3 Closing Dams  
(Flow of 124,000 cfs)

Vector Velocity Scale:

→  
5 feet/sec



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ROCK ISLAND, ILLINOIS

PREPARED BY: T. Krszeng  
CHECKED BY: R. Deveroy

Navigation Improvement Study of the Upper Mississippi  
River Near Savanna Bay, Pool 13

Plan View of Depth - Averaged Velocity Vectors,  
SMS Model

PLATE NO.

49